376.
Accession number:13028311
Title:Direct observation of the terahertz optical free induction decay of molecular rotation absorption lines in the sub-nanosecond time scale
Authors:Chesnokov, E.N. (1); Kubarev, V.V. (2); Koshlyakov, P.V. (1); Kulipanov, G.N. (2)
Author affiliation:(1) Inst. of Chem. Kinetics & Combustion, Novosibirsk, Russia; (2) Budker Inst. of Nucl. Phys., Novosibirsk, Russia
Source title:Applied Physics Letters
Abbreviated source title:Appl. Phys. Lett. (USA)
Volume:101
Issue:13
Publication date:24 Sept. 2012
Pages:131109 (4 pp.)
Language:English
ISSN:0003-6951
CODEN:APPLAB
Document type:Journal article (JA)
Publisher:American Institute of Physics
Country of publication:USA
Material Identity Number:AB34-2012-044
Abstract:Optical free induction decay (FID) in the region of 60-75 $cm^{-1}$ was detected using 120 ps pulses of free electron laser. Signals were detected in real time using ultra-fast Schottky diode detectors. The oscillations corresponding to the splitting of absorption lines in deuterated water vapor ($\Delta f = 0.15$ $cm^{-1}$) and hydrogen bromide ($\Delta f = 0.02$ $cm^{-1}$) were detected. At high optical density, we observed the oscillations arising from “top-hat” shape of absorption lines. Free induction decay signals could be detected in a single shot. This observation allowed obtaining a spectrum in one laser pulse, which facilitates studies of very fast processes.
Number of references:26
Inspec controlled terms:free electron lasers - hydrogen compounds - light absorption - Schottky diodes
Uncontrolled terms:free induction decay signals - hydrogen bromide - deuterated water vapor - absorption lines splitting - ultra-fast Schottky diode detectors - signal detection - free electron laser - sub-nanosecond time scale - molecular rotation absorption lines - terahertz optical free induction decay direct observation - HBr
Inspec classification codes:A4255T Free electron lasers - A4225B Optical propagation, transmission and absorption - A4260B Design of specific laser systems - B4320K Free electron lasers - B2560H Junction and barrier diodes
Chemical indexing:HBr Br H
Treatment:Practical (PRA)
Discipline:Physics (A); Electrical/Electronic engineering (B)
DOI:10.1063/1.4754826
Database:Inspec
IPC Code:H01L29/00